

CLAIMS

1. A device for growing a plant or germinating a seed into a plant, wherein said plant may have one or more roots, said device for covering a vessel for containing a liquid, said device comprising:
 - a) a means for removably suspending said plant in a gas above said liquid;
 - b) a means for elevating a first portion of said liquid above the remaining liquid in said vessel and into said gas wherein said first portion of liquid falls through said gas into said remaining liquid; and
 - c) a means for contacting a second portion of said liquid with said plant, seed, or a growth medium contacting said plant or seed and allowing said second portion of liquid to return to the remaining liquid;
 whereby said one or more roots are permitted to grow in said gas and in said remaining liquid.
2. A device for growing a plant or germinating a seed into a plant, wherein said plant may have one or more roots, said device comprising:
 - a) a vessel for containing a liquid;
 - b) a means for removably suspending said plant in a gas above said liquid;
 - c) a means for elevating a first portion of said liquid above the remaining liquid in said vessel and into said gas wherein said first portion of liquid falls through said gas into said remaining liquid; and
 - d) a means for contacting a second portion of said liquid with said plant, seed, or a growth medium contacting said plant or seed and allowing said second portion of liquid to return to the remaining liquid;
 whereby said one or more roots are permitted to grow in said gas and in said remaining liquid.
3. A device for growing a plant or germinating a seed into a plant, wherein said plant has one or more roots, said device comprising:
 - a) a vessel for containing a liquid;
 - b) a means for removably suspending said plant in a gas above said liquid;
 - c) a conduit in fluid communication with said liquid and said gas; and
 - d) a means for delivering a first portion and a second portion of said liquid through said conduit whereby said first portion of liquid falls through said gas into the remaining liquid in said vessel and said second portion of liquid contacts said plant, seed, or a growth medium contacting said plant or seed, and descends into said remaining liquid;
 whereby said one or more roots are permitted to grow in said gas and in said remaining liquid.
4. The device of claim 3 wherein said first portion of liquid falls in drops or streams.
5. The device of claim 4 wherein said drops have diameters greater than about 200 microns, greater than about 350 microns, greater than about 500 microns, greater than about 1000 microns, greater than about 2000 microns, or greater than about 5000 microns.

6. The device of claim 3 wherein said conduit is also in fluid communication with said liquid and said plant, seed, or growth medium contacting said plant.
7. The device of claim 3 further comprising a means for delivering a third portion of said liquid through said conduit whereby said third portion of liquid falls through said gas, is permitted to contact said one or more roots, and contacts said remaining liquid.
8. The device of claim 3 wherein said second portion of liquid contacts said plant, seed, or said growth medium at about or below the height of said seed or transition region of said plant.
9. The device of claim 3 for growing more than one plant.
10. The device of claim 9 comprising a means for delivering said second portion of liquid to each of a plurality of plants separately.
11. The device of claim 3 wherein said first portion of liquid only contacts said gas and said remaining liquid.
12. The device of claim 3 wherein said conduit has separate first and second exits for said first and said second portions of liquid.
13. The device of claim 3 wherein said first portion of liquid is delivered substantially vertically downward.
14. The device of claim 3 wherein said first portion of liquid falling through said gas into said remaining liquid increases the dissolved oxygen content of said remaining portion of liquid or said first portion of liquid or both.
15. The device of claim 3 wherein said first portion of liquid falling into said remaining liquid increases negative ions within said device.
16. The device of claim 3 wherein said liquid and said one or more roots are completely contained in one vessel.
17. A method for growing a plant or germinating a seed into a plant, said method comprising:
 - a) providing a device of claim 3;
 - b) delivering a first portion and a second portion of said liquid through said conduit whereby said first portion of liquid falls through said gas into the remaining liquid in said vessel and said second portion of liquid contacts said plant, seed, or a growth medium contacting said plant or seed, and descends into said remaining liquid; and
 - c) providing nutrients, carbon dioxide, oxygen, and light to said plant;
 whereby said plant grows and a root of said plant is permitted to grow in said gas and in said remaining liquid.
18. A kit for growing a plant or germinating a seed into a plant, said kit comprising:
 - a) a device for growing a plant or germinating a seed into a plant wherein said plant has one or more roots comprising:
 - 1) a vessel for containing a liquid;
 - 2) a means for removably suspending said plant in a gas above said liquid;

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- 3) a conduit in fluid communication with said liquid and said gas; and
- 4) a means for delivering a first portion and a second portion of said liquid through said conduit whereby said first portion of liquid falls through said gas into the remaining liquid in said vessel and said second portion of liquid contacts said plant, said seed, or a growth medium contacting said plant or seed, and descends into said remaining liquid;

whereby said one or more roots are permitted to grow in said gas and in said remaining liquid; and

- b) instructions for using said device.

19. A method for growing a plant or germinating a seed into a plant, wherein said plant has at least one root, said method comprising:

- a) providing a vessel for containing a liquid;
- b) providing a means for removably suspending said plant in a gas above said liquid;
- c) providing a conduit in fluid communication with said liquid and said gas; and
- d) providing a means for delivering and delivering a first portion and a second portion of said liquid through said conduit whereby said first portion of liquid falls through said gas into the remaining liquid in said vessel, and whereby said second portion of liquid contacts said plant, said seed, or a growth medium contacting said plant or seed, and descends into said remaining liquid;

whereby said root of said plant is permitted to grow in said gas and in said remaining liquid.

20. A method for delivering oxygen to a plant or seed which will germinate into a plant, said method comprising:

- a) providing a plant with at least one root or a seed which will germinate into a plant having at least one root;
- b) providing a liquid capable of having oxygen dissolved therein;
- c) providing a gas comprising oxygen gas;
- d) providing a means for elevating and elevating a portion of said liquid above the remaining liquid;
- e) allowing said portion of liquid to fall through said gas into said remaining liquid whereby oxygen gas dissolves in said portion of liquid or said remaining liquid thereby forming oxygenated liquid; and
- f) providing a means for contacting and contacting said plant or seed with said oxygenated liquid.

21. A method for increasing the dissolved oxygen concentration in a liquid within a hydroponics device comprising:

- a) providing a hydroponics device comprising: a vessel for containing a liquid; a means for removably suspending one or more of a plant, seed, a growth medium for contacting said

plant or seed, and a net basket in a gas above said liquid, and a means for elevating a first portion and a second portion of said liquid above said remaining liquid and into said gas whereby said first portion of liquid falls through said gas into the remaining liquid in said vessel, and whereby said second portion of liquid can contact said plant, said seed, or a growth medium contacting said plant or seed, and descends into said remaining liquid; whereby said root of said plant is permitted to grow in said gas and in said remaining liquid;

- b) elevating said first portion of liquid above said remaining liquid and into said gas;
- c) elevating said second portion of liquid above said remaining liquid and into said gas;
- d) allowing said first portion of liquid to fall through said gas and into said remaining liquid; and
- e) allowing said second portion of liquid to contact said plant, seed, growth medium, or net basket and descend into said remaining liquid;

whereby the dissolved oxygen concentration in said first portion of liquid, in said remaining liquid, or in both is increased.

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